

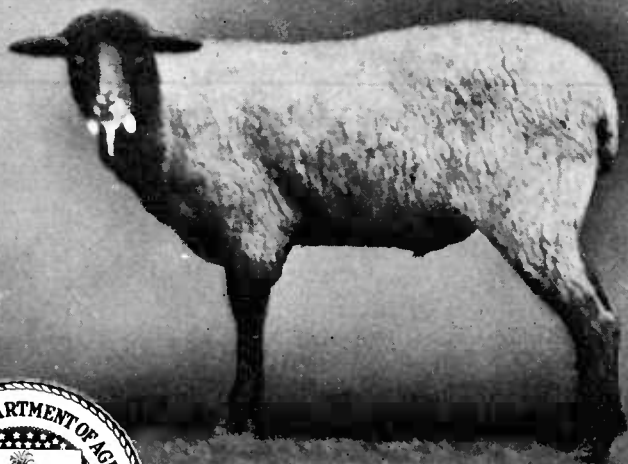
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U. S. DEPARTMENT OF
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THE
STOCK-POISONING
DEATH CAMAS



THE DEATH-CAMAS plants cause very heavy losses of sheep on the western stock ranges, greater losses than any other plant, and perhaps greater than all others combined. Recent work has shown that the various forms of death camas are not equally dangerous. It is important that those handling animals on the range should not only recognize death camas but be able to make the distinction between the different kinds. This bulletin, in a concise way, gives this information.

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THE STOCK-POISONING DEATH CAMAS

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OF ALL the poisonous plants which cause losses to the sheepmen of the western stock ranges, death camas, without doubt, is the most troublesome. The death-camas plants have long been known as poisonous, but it is only within comparatively recent years that definite knowledge of their properties has been acquired. As early as 1834 an explorer in the Northwest reported that his horses were made sick by a plant which we have every reason to think was death camas. The first detailed account of these plants was made by Chesnut and Wilcox¹ in 1901. From 1909 to the present time more or less continuous experimental work has been carried on by the Department of Agriculture, and four detailed bulletins, U. S. Department of Agriculture Bulletins Nos. 125, 1012, 1240, and 1376 have been published. It is important that all stock owners using the western ranges should be thoroughly informed in regard to these plants because of the heavy losses, especially of sheep, which frequently occur. The plants, moreover, are very widely distributed throughout the West and in many localities grow in great abundance.

COMMON NAMES OF THE PLANTS

These plants, which belong to the botanical genus *Zygadenus*, are recognized under a number of popular names, of which death camas is the one more generally used. In many localities the plants are called "poison sego"; quite generally throughout the Pacific States they are known as "lobelia." Other names occasionally applied are "soap plant," "alkali grass," "water lily," "squirrel food," "wild onion," "mystery grass," and "hog's potato."

¹ CHESNUT, V. K., and WILCOX, E. V. THE STOCK-POISONING PLANTS OF MONTANA. U. S. Dept. Agr., Div. Bot., Bull. No. 26, 150 p., illus., 1901.

CHARACTERISTICS OF THE PLANTS

All the plants have the same form, growing from an underground bulb, the parts above ground consisting of grasslike leaves and a long flower stem which bears a cluster of yellow or greenish-yellow flowers. With the exception of the mountain death camas, they are plants of the spring and early summer, being in full blossom in June. The mountain death camas blossoms about a month later. By some the death camas has been confused with the wild onions. They are easily distinguished, as the onions have pinkish or rose-colored flowers and a strong onion or garlic odor and taste.

EFFECTS PRODUCED

All these plants produce a similar line of symptoms, the most noticeable being salivation, nausea followed by vomiting, a lowered temperature, weakness, shown by staggering or complete prostration, difficult breathing, sometimes coma, a condition in which an animal may lie for hours or even days, followed by death.

The seeds of most death-camas plants are especially harmful. The other parts of the plant are about equally poisonous, but less so than the seeds. As the bulbs are not ordinarily pulled up by grazing animals, the injurious effects result for the most part from eating the leaves, stems, and flowers.

ANIMALS AFFECTED

Most of the animals lost by poisoning have been sheep, but the plants also poison cattle and horses. Under range conditions, however, cattle are seldom poisoned except by Nuttall's death camas. Horses are frequently made sick, but fatal cases are rather rare. Human beings have been poisoned, sometimes fatally, when children have eaten the bulbs out of curiosity or adults have gathered the plant, supposing it to be the edible sego, a species of *Calochortus*.

SPECIES DIFFER IN POISONOUS PROPERTIES

When it was found that death camas was poisonous, it was assumed that all the different kinds, because of their close resemblance, probably had the same properties, and on this assumption the Department of Agriculture has issued warnings to stock people to be careful to avoid all patches of death camas. Recently, however, it has been found that the different species vary in their poisonous properties, and on that account it seems best to describe briefly those kinds of death camas with which the stockman is most likely to come in contact. For the purposes of stockmen, five fairly well-recognized species may be considered of special importance, because they are widely distributed and grow in large masses.

Characteristics of the common death-camas species

	Grassy	Meadow	Foothill	Mountain	Nuttall's
Leaves.....	Slender, grass-like, $\frac{1}{8}$ to $\frac{3}{8}$ inch wide.	Slender, erect, $\frac{1}{8}$ to $\frac{1}{4}$ inch wide.	Thicker, not so erect as others. $\frac{3}{8}$ to $\frac{1}{2}$ inch wide.	Slender, whitened, $\frac{1}{8}$ to $\frac{1}{2}$ inch wide.	Somewhat curved, $\frac{1}{4}$ to $\frac{3}{4}$ inch wide.
Height of flower stem.	8 to 15 inches....	6 inches to 2 feet.	1 to 2½ feet....	1 to 2 feet 5 inches.	1 to 2 feet
Time of flowering.	May-June.....	June-August ...	April-June.....	June-August....	May-June.
Where found..	Hillides, Montana, Wyoming, etc.	Meadows, California, Oregon, Washington, and Nevada.	Gravelly ridges, intermountain region below 8,500 feet.	Wet places in high mountains.	Oklahoma, eastern Kansas and Texas.
Result of eating.	Sickness, frequently fatal.	Sickness, sometimes fatal.	Sickness, sometimes fatal.	Not poisonous under field conditions.	Sickness, sometimes fatal.
Quantity per hundred-weight of animal to produce death.	Half pound.....	2 pounds.....	2.5 pounds.....	6 pounds.....	1 pound.

GRASSY DEATH CAMAS (ZYGADENUS GRAMINEUS) ²

The grassy death camas is the form most common in Montana, Wyoming, and the neighboring States. This plant has slender, grasslike leaves, a stem from 8 to 15 inches in height, and grows on hillsides. In southern Montana it is most abundant in shallow depressions on the north sides of hills, but it does not grow in moist situations. This form of death camas is without doubt the most dangerous of the western species. The quantity which may produce sickness is from half a pound and upward per hundred pounds of animal, and there is very little difference between the quantity which produces sickness and the quantity which produces death. It follows that a very large number of the sheep which are poisoned by this form of death camas are likely to die.

MEADOW DEATH CAMAS (ZYGADENUS VENENOSUS)

Meadow death camas is known quite generally in the Pacific States as lobelia. As the use of this name leads to some confusion, it would be better if the name "meadow death camas" would come into common use. It has narrow, erect leaves, and the flower stem may reach a height of 2 feet. The plant is found in California, Oregon, and Washington, and ranges eastward into Nevada and some of the other States. The plant grows in meadows, generally in those that are very wet, and sometimes forms a considerable portion of the hay that is made in those localities. The meadow death camas is about equally poisonous with the grassy death camas, but it is an especially interesting fact that the quantity required to produce death is very much greater than that of the grassy death camas. It follows that while the meadow death camas is just as likely to produce sickness as the grassy death camas, more of the cases are likely to recover. Many cases of the poisoning of horses by the meadow death camas in hay have been reported.

² In Bulletin 125 of the U. S. Department of Agriculture, which treated of this species, the plant was wrongly identified as *Zygadenus venenosus*.

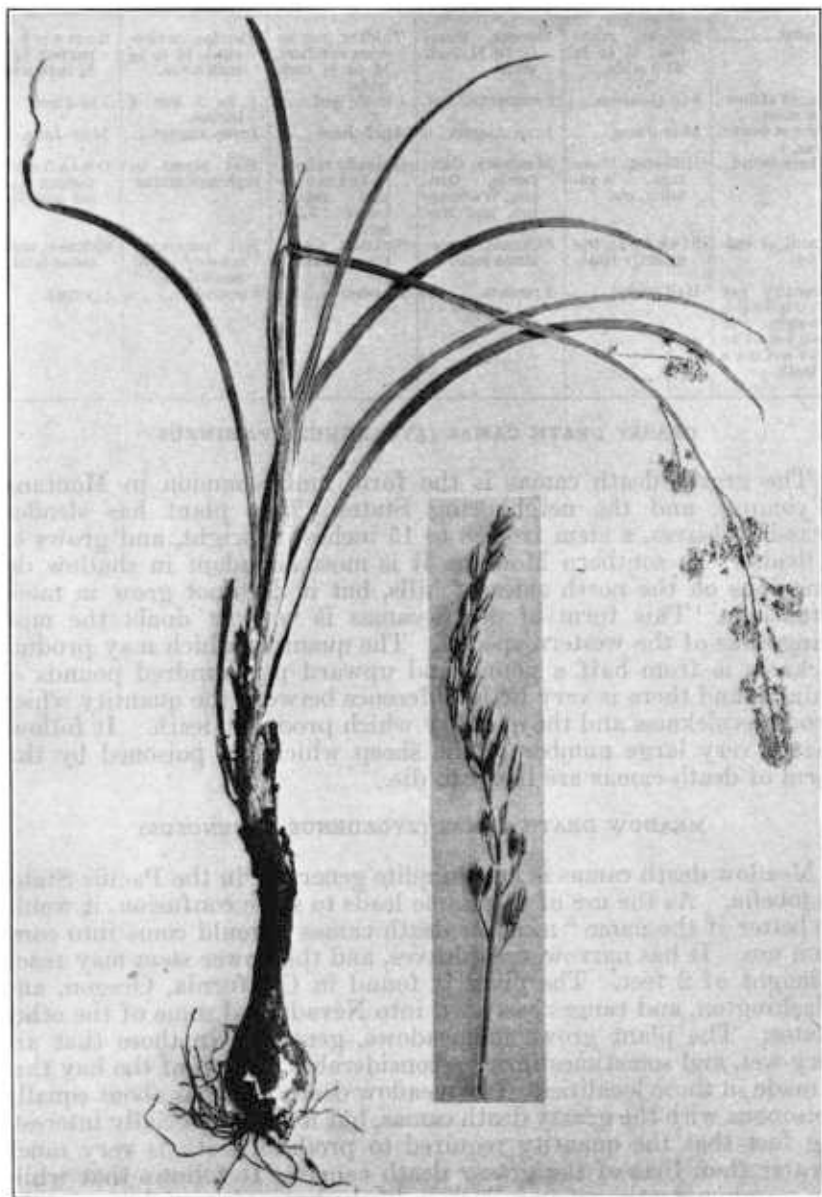


FIG. 1.—Grassy death camas (*Zygadenus gramineus*), showing the plant in flower, and (in the insert) the fruiting stem

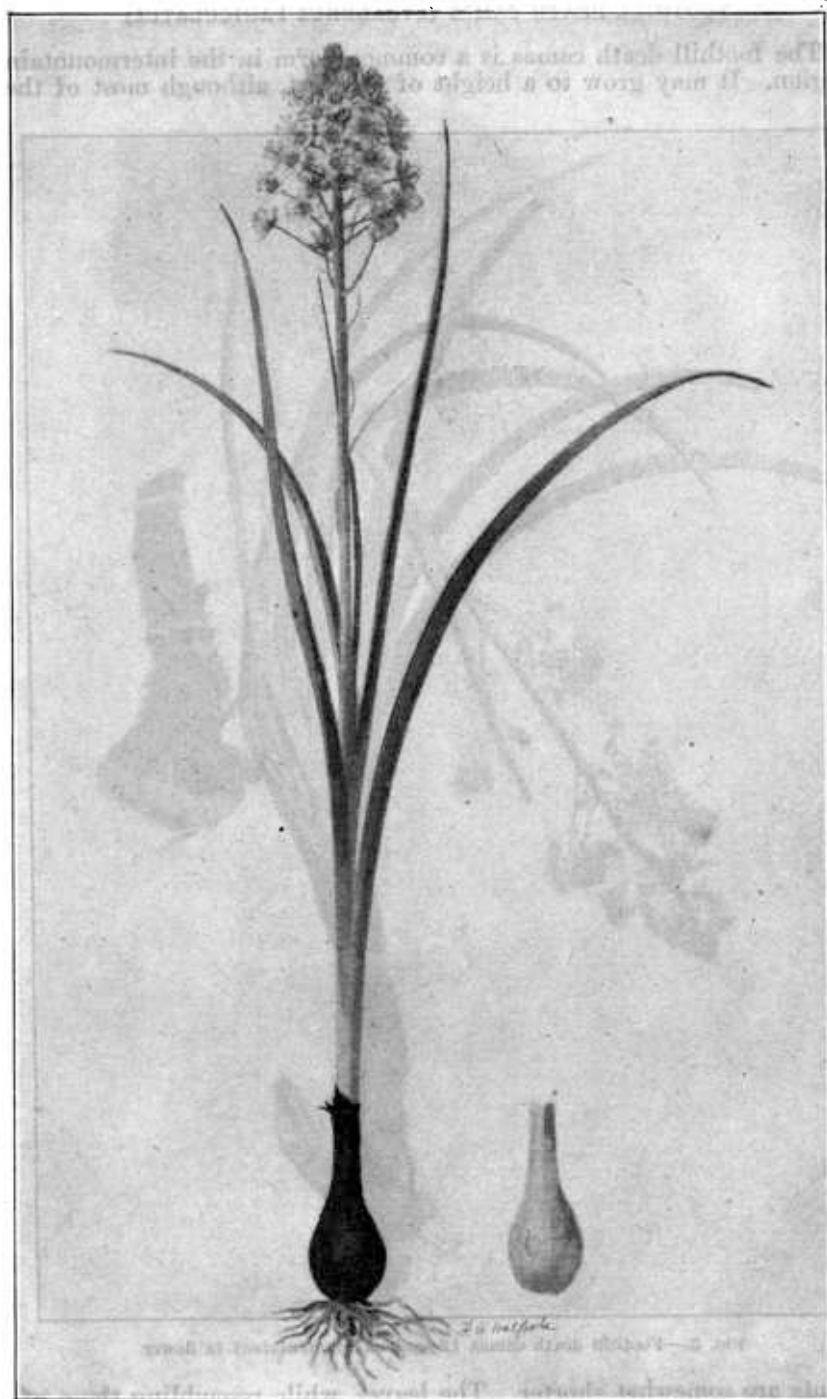


FIG. 2.—Meadow death camas (*Zygadenus venenosus*) in early flower

FOOTHILL DEATH CAMAS (*ZYGADENUS PANICULATUS*)

The foothill death camas is a common form in the intermountain region. It may grow to a height of 2½ feet, although most of the

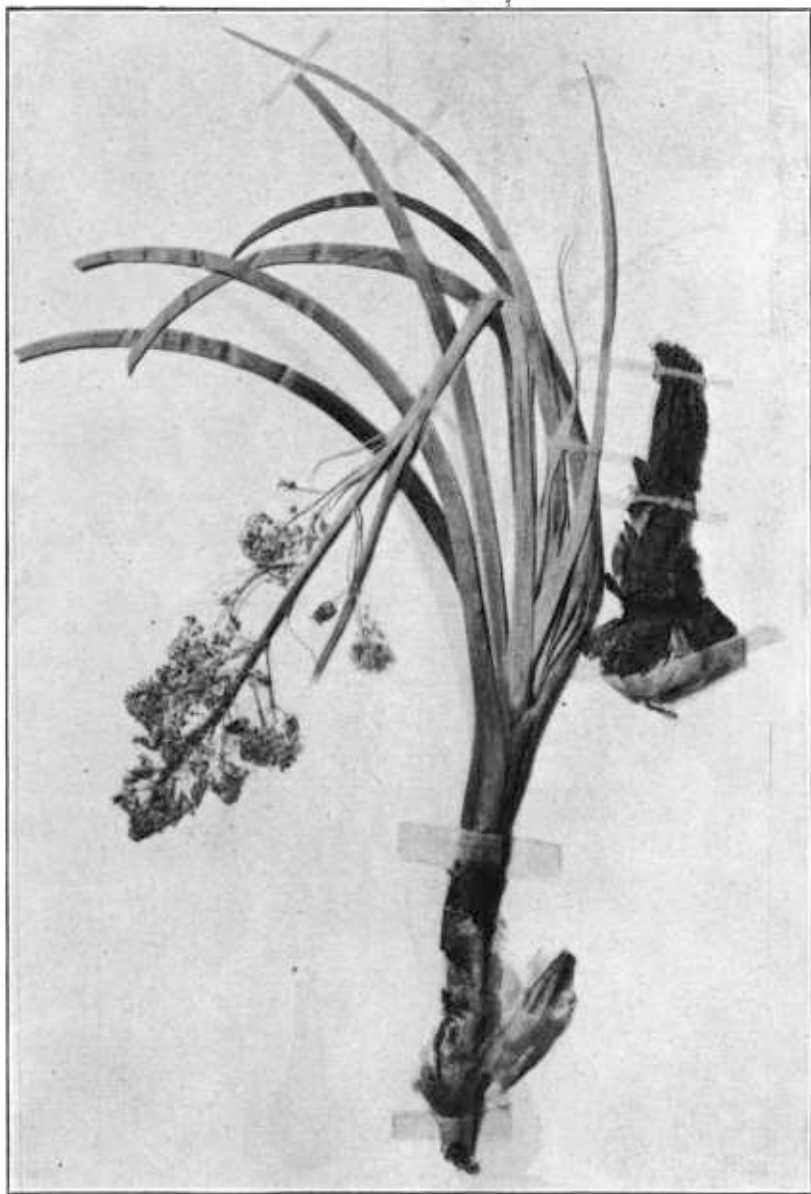


FIG. 3.—Foothill death camas (*Zygadenus paniculatus*) in flower

plants are somewhat shorter. The leaves, while resembling those of the other forms of death camas, are thicker and are not so erect as in the other species. The flowers are panicked; that is, the cluster is

elongated and branched. It grows on gravelly ridges and dry, flat areas up to an elevation, in some cases, of 8,500 feet. This plant is

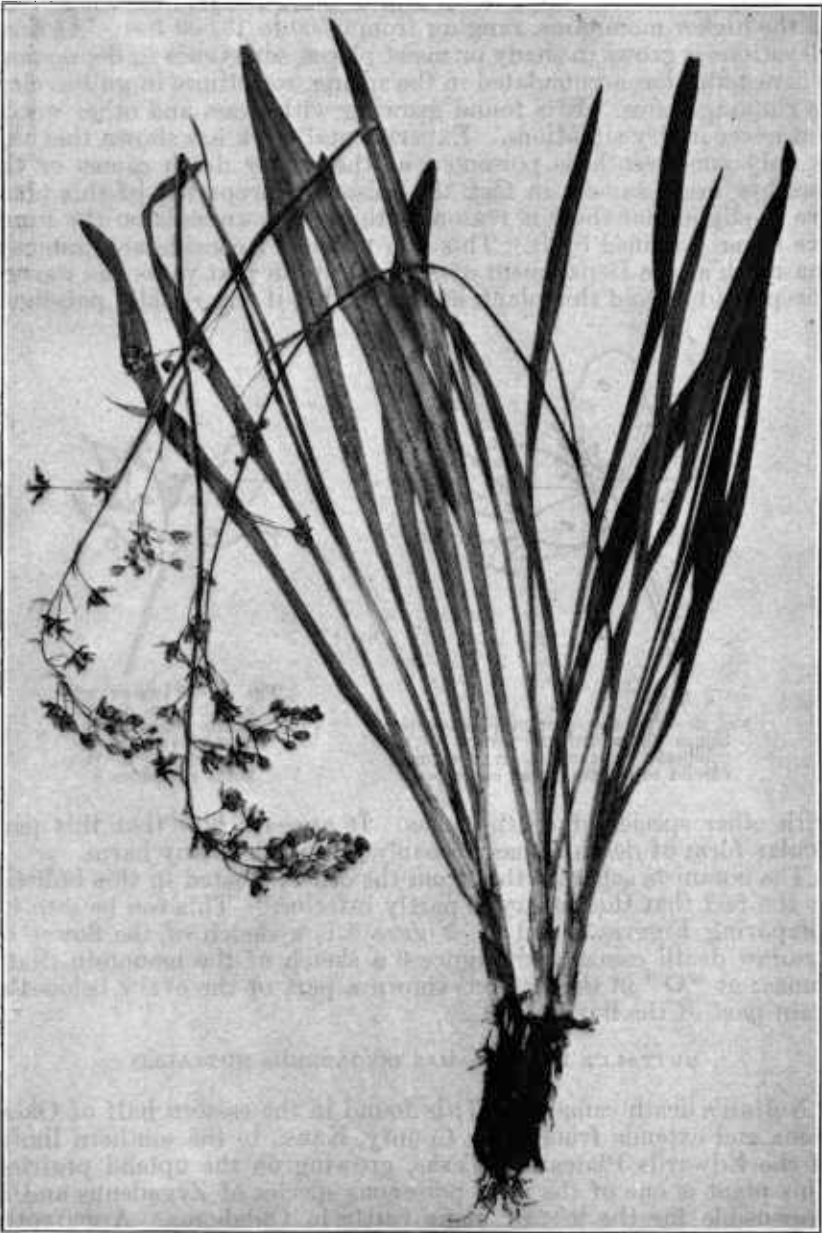


FIG. 4.—Mountain death camas (*Zygadenus elegans*) in flower

only about one-third as poisonous as the grassy death camas or the meadow death camas, but nevertheless causes serious losses of sheep, more particularly in Utah and Nevada.

MOUNTAIN DEATH CAMAS (ZYGADENUS ELEGANS)

The mountain death camas has long, slender leaves and may grow to a height of more than 2 feet. In the West this plant is found only in the higher mountains, ranging from 6,500 to 13,000 feet. At these elevations it grows in shady or moist places, sometimes in depressions where water has accumulated in the spring, sometimes in gullies close to running water. It is found growing with grass and other weeds, but never in dry situations. Experimental work has shown that this is only one-seventh as poisonous as the grassy death camas or the meadow death camas; in fact, the poisonous properties of this plant are so slight that there is reason to think that animals on the range are never poisoned by it. This is a matter of considerable interest, inasmuch as the Department of Agriculture in past years has warned sheepmen to avoid this plant, assuming that it was equally poisonous

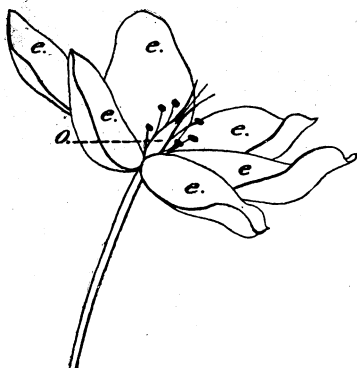


FIG. 5.—The flower of meadow death camas in which the ovary O is "superior"; that is, it does not extend below the floral envelopes e

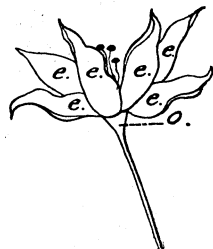


FIG. 6.—Flower of mountain death camas showing at O the ovary partly "inferior" to the floral envelopes e

with other species of death camas. It appears now that this particular form of death camas probably never causes any harm.

The botanists separate this from the others treated in this bulletin by the fact that the "ovary is partly inferior." This can be seen by comparing Figures 5 and 6. Figure 5 is a sketch of the flower of meadow death camas and Figure 6 a sketch of the mountain death camas; at "O" in the latter is shown a part of the ovary below the main part of the flower.

NUTTALL'S DEATH CAMAS (ZYGADENUS NUTTALLI)

Nuttall's death camas (fig. 7) is found in the eastern half of Oklahoma and extends from Riley County, Kans., to the southern limits of the Edwards Plateau in Texas, growing on the upland prairies. This plant is one of the most poisonous species of *Zygadenus* and is responsible for the loss of many cattle in Oklahoma. Apparently many animals poisoned by it recover. The symptoms of sickness are like those produced by the other species of death camas.

REMEDIES

Experiments have shown quite conclusively that there is no effective remedy which can be used for death-camas poisoning. The most



FIG. 7.—Nuttall's death camas (*Zygadenus nuttallii*). The form of the plant is shown both in flower and in seed

that can be done is to keep the animals quiet, see that they have water and food as they require it, and then wait, hoping for favorable re-

sults. As stated in the descriptions of the plants, the chances of recovery from poisoning by grassy death camas are not very good, but with the other species a considerable proportion of the animals may be expected to survive.

HOW TO AVOID POISONING

Inasmuch as these plants ordinarily occur in somewhat thick patches and can be recognized readily by one who knows them, it is comparatively easy for a good herder to keep his sheep away from them. It may be remembered that it takes a considerable quantity to poison an animal seriously, so that one need not be afraid to permit the animals to eat a few of the plants. It is very important not to allow hungry animals to graze to any extent on places where these plants are growing in quantity. If animals, when trailed from one locality to another, become hungry and then come upon a patch of death camas, many cases of poisoning are almost certain to occur. On the other hand, well-fed animals, especially if allowed to graze in loose formation, may escape harm, even if death camas is fairly abundant. The danger from hay is almost entirely with the meadow death camas. This, as stated before, grows in quantities in meadows and frequently is cut with the grass, particularly if the grass is cut somewhat early. As the dry plant retains its poisonous properties, serious sickness may follow from the use of the hay.

SUMMARY

All kinds of death camas are poisonous.

The losses by the western species are largely of sheep, although the plants may affect cattle and horses and sometimes poison people; Nuttall's death camas is especially destructive to cattle.

Of the different kinds the grassy and the meadow death camas are equally poisonous, but the grassy is much more likely to cause death. The foothill death camas is only one-third as poisonous as the grassy death camas or the meadow death camas. The mountain death camas is only one-seventh as poisonous as the grassy death camas or the meadow death camas, and rarely, if ever, poisons any animals under range conditions. Nuttall's death camas is more poisonous than the other species, but many animals recover.

There are no practical remedies which can be administered for death-camas poisoning. Dependence must be placed on prevention rather than cure.